

PATENT SPECIFICATION

595,100



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PROVISIONAL SPECIFICATION

A New or Improved Float-actuated Valve

I, EDWARD LUSBY ABEX, a British subject, of 1, Prince's Avenue, Grimsby, Lincolnshire, do hereby declare the nature of this invention to be as follows:—

5 This invention relates to a new or improved float-actuated valve and provides a valve in which the valve proper is positively actuated both when opening and closing, and which is so constructed and designed that there will be extreme durability of the valve proper and its seating. Amongst other objects the invention has in view to provide a valve which will be silent in operation and in which there is absence of splash even if the valve comes adrift, and in which the possibility of valve chatter is materially reduced. Further objects are to provide a valve, the components of which can be expeditiously assembled and dismantled, and which is likely to be foolproof in action. The invention further aims at overcoming a defect which obtains in valves of the ordinary kind, that is to say the seizing of the valve in its housing by particles of grit which become lodged around the valve; in the valve provided by the invention the stream of water or other liquid is constantly passing the valve itself to wash away any particles which might become lodged around it.

According to the invention, the valve body, which preferably is a one-piece casting, has a downwardly extending bell-mouthed outlet to the inlet passage, the latter being in the form of a tube suitably formed at one end to fit on to a feed pipe and having its other end closed permanently or else by a removable cap. The bell-mouthed outlet has an inner or intermediate portion which is parallel-sided, the base of said portion being formed with a valve seat in which is formed a port communicating with the inlet passage. The bell-mouth of the outlet is of greater diameter than the aforesaid parallel-sided portion and also may be parallel-sided or may be somewhat conical.

A float-carrying arm is pivotally attached to the bell-mouthed outlet preferably at or near the bottom of same and

passes diametrically across and beyond said outlet. At the opposite side of said outlet the float arm may pass between the vertical limbs of a forked guide depending from the outlet and if desired said guide may have an adjustable stop for limiting the drop of the float arm. Alternatively, the bell-mouth may be formed externally with a pair of parallel cheeks between which is pivotally mounted the end of the float-carrying arm, said arm being extended beyond the pivot so that the extension operates between the cheeks aforesaid, the extremity of the arm being upturned and being adapted to contact with the valve body to limit the downward movement of the float arm. The latter is steadied by the cheeks to prevent shaking of said arm.

As stated, the float arm passes diametrically across and beneath the bell-mouthed outlet and at a position coinciding with the axis of said outlet there is pivotally attached to said float arm the shank of the valve proper. Said valve proper has a disc-like head situated and operating within the parallel-sided portion of the outlet, and has a coaxial tubular portion of less diameter upstanding from said disc. Said tubular portion has fitted therein a replaceable plug which projects from it and which forms the actual valve member adapted to bed on to the valve seating aforesaid.

The disc-like head of the valve is a loose fit in the parallel-sided portion of the outlet passage and/or openings or gaps are formed in said head, to allow passage for the liquid being delivered, the arrangement preferably being that the passage so afforded is less in area than that afforded by the communication hole in the valve seating. This restriction will create an increased pressure in the chamber situated between the disc portion of the valve head and the valve seating, thereby ensuring sufficient downward pressure on the float arm. This pressure will drop when the float arm has been raised to the extent that partial closure has taken place at the valve seat; that is

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to say, when the passage afforded at said seat is less than that via the valve head. This will result in the float encountering less resistance in completing the closure of the valve.

The valve plug may be made of any suitable material such as rubber, and by reason of its length has appreciably more resilience with a substance of given quality than is obtainable with the ordinary simple disc valve. Said valve plug may have its operating end shaped part-spherical, conical or otherwise, and the valve seating may or may not be shaped to correspond.

If desired, an air hole is formed in the wall of the outlet passage to break any syphon effect which might otherwise be set up in cutting off the water supply, in cases where the bell-mouthed outlet is submerged in the cistern or tank.

Further, an air pocket or chamber may be provided above and communicating with the inlet pipe, to cushion any hammering effect that might tend to arise.

The parts can be readily dismantled when necessity arises, simply by with-

drawing a split pin or the like which pivotally attaches the float arm to the body of the valve, the valve proper being removed with the float arm as a component thereof.

After flushing, the float arm will remain for a considerable period of time in its lowered position whilst filling takes place, this being due to the incoming water thrusting itself on the projecting flange portion of the valve head. Eventually when the buoyancy pressure of the float reaches a certain value the float arm will rise with a more or less sudden movement to effect cut-off. Thus, a quick rate of filling is maintained and the absence or decrease of the usual hovering of the valve appreciably reduces wear of the seating part of said valve.

Dated the 19th day of June, 1945.
KINGS PATENT AGENCY LIMITED,
By R. HUNTER,

Secretary,
Registered Patent Agent,
146A, Queen Victoria Street,
London, E.C.4,
Agents for the Applicant.

COMPLETE SPECIFICATION

A New or Improved Float-actuated Valve

I, EDWARD LUSBY ABEY, a British subject, of 1, Prince's Avenue, Grimsby, Lincolnshire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to float-actuated valves which have a pressure chamber by which the feed water pressure is utilized as a means for keeping the valve open to an appreciable extent whilst filling of a cistern or tank takes place. The float-actuated valve of the type according to the invention is positively actuated both when opening and closing, is so constructed and designed that there will be extreme durability of the valve proper and its seating, that it will be relatively quiet in operation with an absence of splash even if the valve comes adrift, and that the possibility of valve chatter is materially reduced. It is a feature of the improved valve that the components thereof can be expeditiously assembled and dismantled, and that action is likely to be foolproof. At the same time, there is overcome a defect which obtains in valves of the ordinary kind, that is to say

the seizing of the valve in its housing by particles of grit which become lodged around the valve; in the valve provided by the invention, as in valves of similar type, the stream of water or other liquid is constantly passing the valve itself to wash away any particles which might become lodged around it.

According to the invention there is provided a float actuated valve comprising a valve body having a pressure chamber in the form of a cylindrical body tapering at one end to an admission orifice and connected at the other end to a substantially bell-shaped skirt, said chamber being provided at the skirt end with a valve-carrying disc-like head of a plunger which has clearance with the chamber to provide a delivery opening more restricted in area than that of the admission orifice whereby liquid pressure may be built up tending to keep the disc and valve away from the admission orifice, and a resilient valve plug smaller than and carried on the inner face of the disc and shaped to make a sealing fit with the tapered end of the cylindrical body to close the admission orifice after a predetermined movement of the disc towards

the orifice, a plunger rod being surrounded by the skirt and supported at its outer end by a float lever pivotally mounted on the skirt so that it passes across the mouth of the skirt.

A float-actuated valve in accordance with the invention is shown in the accompanying drawings, wherein:—

Figure 1 is a vertical section through the valve,

Figure 2 is a vertical section at right angles to the plane of Figure 1, and

Figure 3 is a sectional plan on line $x-x$ of Figure 1.

In the apparatus shown, a valve body 1, which preferably is a one-piece casting, has a downwardly extending bell-mouthed skirt or outlet 2, a cylindrical centre portion 3 and an upper portion 4 in the form of a boss externally threaded to fit on to a feed pipe. Internally of the body a conical portion 5 connects the cylindrical centre portion 3 to a bore 6 formed in the boss 4, a part of said conical portion constituting a valve seat. The bell-mouthed skirt 2 is of greater diameter than the parallel-sided portion 3 and also may be parallel-sided or may be somewhat conical.

A float-carrying lever 7 is fulcrumed on a split pin 8 bridging the space between cheeks 9, the lever operating between the cheeks. The fulcrum pin 8 is near the bottom of the bell-mouthed skirt. The lever 7 passes diametrically across the mouth of the skirt 2. On that side of the skirt which is opposite the fulcrum pin 8, the float lever passes between the vertical limbs of a forked guide constituted by legs 19 depending from the skirt; if desired said guide may have a fixed or adjustable stop 10 for limiting the drop of the float lever. An extension 11 of the float lever beyond the fulcrum is located between the cheeks 9 and is upturned to maintain a position between them during operation. This extension may be adapted to contact with the valve body to limit the downward movement of the lever instead of providing the stop 10. The lever is steadied by the cheeks 9 to prevent shaking of said lever.

As stated, the float lever 7 passes diametrically across and beneath the bell-mouthed skirt 2, and at a position coinciding with the axis of said skirt 2 there is pivotally attached to said float lever a valve plunger. Said valve plunger comprises a rod 12 having a disc-like head 13 situated and operating within the parallel-sided portion 3 of the body. A coaxial tubular collar 14 upstands from said disc head. Said collar 14 has fitted therein a replaceable

resilient plug 15 which projects from it and which forms the actual valve member, said plug having a tapered upper end adapted to bed on to the valve seating presented by wall 5. The plunger rod 12 has a bifurcated outer end 16 receiving the lever 7, a split pin 17 connecting the two parts together.

The disc-like head 13 of the plunger is a loose fit in the parallel-sided portion 3 of the body, and openings or gaps may be formed in said head to allow passage for the liquid being delivered, the arrangement being that the passage so afforded is less in area than that afforded by the body bore 6. This constriction will maintain water pressure in the chamber 18 situated between the disc head 13 and the valve seating, the feed-water pressure exerting a thrust on the flange presented by that part of the head 13 which is external of collar 14. This ensures downward pressure on the float lever. This pressure will be maintained to keep the float lever depressed until such time as the lever has become subjected to considerable upward pressure by the float. The feed water pressure continues to oppose the action of the float as the cistern fills, and therefore maintains the lever depressed below the position it would normally have, until by the rising of the float and hence the lever the passage afforded at the valve seat is less than that via the valve head 13. This will result in the float encountering less resistance in completing the closure of the valve due to pressure drop in chamber 18.

The valve plug 15 may be made of any suitable resilient material such as rubber, and by reason of its length has appreciably more resilience with a substance of given quality than is obtainable with the ordinary simple disc valve. Said valve plug has its operating end conically shaped.

If necessary, an air hole is formed in the wall of the skirt 2 to break any syphon effect which might otherwise be set up in cutting off the water supply, in cases where the skirt is submerged in the cistern or tank.

The parts can be readily dismantled when necessity arises, simply by withdrawing the split pin 8 which pivotally attaches the float lever to the body of the valve and the stop 10, the valve proper being removed with the float lever as a component thereof.

After flushing, the float lever will remain for a period of time in its lowered position whilst filling takes place, this being due to the incoming water thrusting itself on the projecting

flange portion of the valve head. Eventually when the buoyancy pressure of the float reaches a certain value the float lever will rise with a more or less sudden movement to effect cut-off. Thus, a quick rate of filling is maintained and the absence or decrease of the usual hovering of the valve appreciably reduces wear of the seating part of said valve.

It will be understood that any suitable means may be used to attach the valve plug 15 to the disc 13.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A float actuated valve comprising a valve body having a pressure chamber in the form of a cylindrical body tapering at one end to an admission orifice and connected at the other end to a substantially bell-shaped skirt, said chamber being provided at the skirt end with a valve-carrying disc-like head of a plunger which has clearance with the chamber to provide a delivery opening more restricted in area than that of the admission orifice whereby liquid pressure may be built up tending to keep the disc and valve away from the admission orifice, and a resilient valve plug smaller than and carried on the inner face of the disc and shaped to make a sealing fit with the tapered end of the cylindrical body to close the admission orifice after a predetermined movement of the disc towards the orifice, a plunger rod being surrounded by the skirt and supported at its outer end by a float lever pivotally mounted on the skirt so that it passes

across the mouth of the skirt.

2. A float-actuated valve according to Claim 1, wherein a collar upstands from the disc and forms a socket for detachably receiving the lower end of the resilient valve plug.

3. A float-actuated valve according to Claim 1 or 2, wherein the valve plug is a cylindrical rubber element terminating at its operative end in a conical surface.

4. A float-actuated valve according to any of the preceding Claims, wherein the disc has liquid flow openings or gaps provided in its periphery.

5. A float-actuated valve according to any one of the preceding claims, wherein the float lever is fulcrumed between a pair of cheeks projecting externally of the bell-like skirt.

6. A float-actuated valve according to Claim 5, wherein the skirt is provided at a position opposite the lever fulcrum with a pair of guide legs between which the lever travels.

7. A float-actuated valve according to Claim 6, wherein the outward movement of the float lever is limited by an extension on the lever which engages the skirt or by a detachable pin on the guide legs.

8. A float-actuated valve comprising the combination of parts as herein described and as shown in the accompanying drawings.

Dated the 20th day of June, 1946.
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FIG. 1.

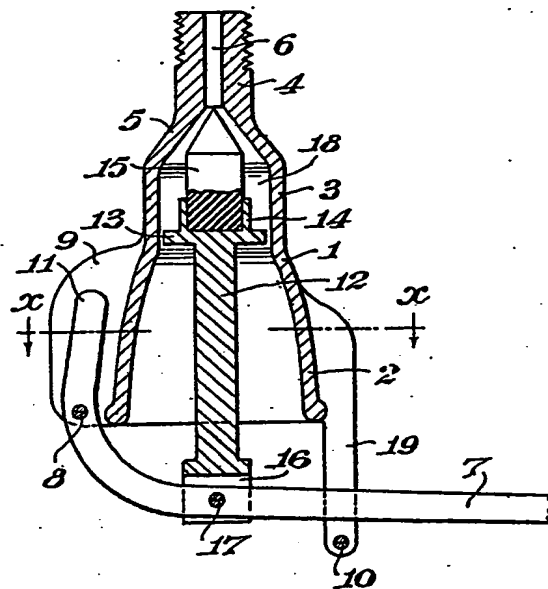


FIG. 2.

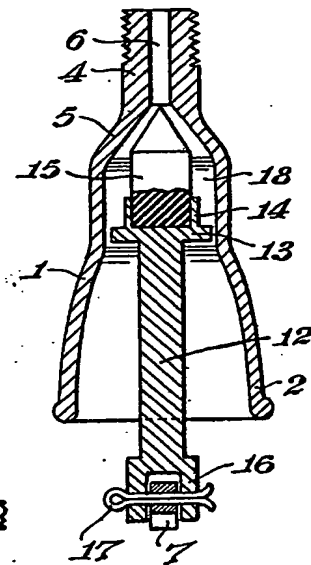
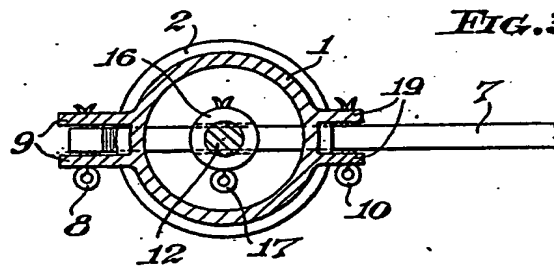


FIG. 3.



[This Drawing is a reproduction of the Original on a reduced scale.]